

REMARKS

This Application has been carefully reviewed in light of the Final Office Action mailed November 12, 2010. In the Final Office Action, the Examiner rejected Claims 1-4, 6-18, and 20, and stated that dependent Claims 5 and 19 recite allowable subject matter. Claims 1 and 17 are herein amended to correct clerical errors. Applicants respectfully request reconsideration and allowance of all pending claims in view of the remarks set forth below.

Allowable Subject Matter

Applicants appreciate Examiner's consideration and indication that dependent Claims 5 and 19 would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. However as stated below, Applicants believe that independent Claims 1 and 17 are allowable in view of the cited prior art.

Rejections under 35 U.S.C. §103

Claims 1-2, 4, and 6-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Benson* (U.S. 3,418,980) in view of *Nickells* (U.S. 2,922,614) further in view of *Trachte* (U.S. 4,725,002).

Claims 3, 17-18, and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Benson* in view of *Nickells* view of *Trachte* and further in view of *Lorraine* (U.S. 2002/0139863).

Applicants respectfully traverse for the reasons set forth below.

In order to establish a prima facie case of obviousness, the references cited by the Examiner must disclose all claimed limitations. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). Even if each limitation is disclosed in a combination of references, however, a claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. *KSR Int'l. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). Rather, the Examiner must identify an apparent reason to combine the known elements in the fashion claimed. *Id.* "Rejections on

obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.*, citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). Finally, the reason must be free of the distortion caused by hindsight bias and may not rely on ex post reasoning. *KSR*, 127 S.Ct. at 1742.

In addition, the M.P.E.P. prohibits combinations or modifications of references where (a) the references teach away from the combination, or (b) the proposed modification would change the principle of operation of the prior art invention being modified. First, M.P.E.P. 2145(X)(D)(2) instructs: **“It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983).”** Second, M.P.E.P. 2143.01(VI) instructs: **“If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.”**

Here, the Examiner’s proposed modification of *Benson* based on *Trachte* is improper for at least the two reasons set forth in the preceding paragraph. First, *Benson* clearly teaches away from the proposed modification. *Benson* teaches a fuel injector that meters fuel using a multi-stroke plunger-based hydraulic pumping technique analogous to that of a pump. (col. 3, line 74 to col. 4, line 19). When a first voltage is applied to the piezo stack 30, the plunger 38 moves downward, which causes fuel to be drawn from a fuel line 16 into an upper fuel chamber 36. (col. 3, lines 56-59). When the voltage applied to the piezo stack 30 is removed, the plunger is pulled upwardly, which forces fluid in the upper fuel chamber 36 into a lower fuel reservoir 46 through an inlet check valve 42. (col. 3, lines 59-62). Then, when a second voltage is applied to the piezo stack 30, the plunger 38 again moves downward, thus pressurizing the fuel in the lower fuel reservoir 46 until the pressure is sufficient to open the injector poppet valve 50 allowing the fuel to expel through the injector nozzle. (col. 3, lines 64-69).

Thus, *Benson* provide a system for metering fuel by controlling the injection value using a hydraulic piston-based pumping technique, as opposed to controlling the injection

valve mechanically, as in *Trachte* and Applicants' system. Thus, *Benson*'s fundamental operation inherently teaches away from using a mechanically control valve. *Benson* also explicitly teaches the advantages of his hydraulic piston-based pumping system as compared to a mechanically-controlled valve. For example, *Benson* teaches:

Yet another object of this invention is the provision of a fuel injection system that has a significantly greater range of injector displacement per stroke that can be precisely and rapidly controlled over the complete range of engine operation than can a mechanically driven system.

Thus, *Benson* both inherently and explicitly teaches away using a mechanical-controlled valve, such as that taught by *Trachte*. Accordingly, the proposed modification of *Benson* based on *Trachte* is improper.

Second, the proposed modification of *Benson* based on *Trachte* would fundamentally change the whole principle of operation of *Benson*'s system, and is thus improper. As discussed above, *Benson* provide a system for metering fuel by controlling the injection value using a hydraulic piston-based pumping technique, as opposed to controlling the injection valve mechanically. In direct contrast, *Trachte* uses a mechanically-controlled value in which a cap 29 is mechanically coupled to a transmission bolt 31, which acts on an end 152 of a valve needle 15 to open the valve. Incorporating the mechanically-coupled cap 29/bolt 31/needle 15 into the piston-based pump system of *Benson* -- assuming this would even be possible, which Applicants do not concede -- would clearly change the fundamental principle of operation of *Benson*'s system. Thus, according to the M.P.E.P., the proposed modification cannot render the claimed invention obvious.

Thus, for at least the various reasons set forth above, Applicants respectfully submit that independent Claims 1 and 17 are not obvious in view of the cited references. Accordingly, Applicants request reconsideration and allowance of independent Claims 1 and 17, as well as all claims that depend therefrom.

CONCLUSION

Applicants have made an earnest effort to place this case in condition for allowance in light of the remarks set forth above. Applicants respectfully request reconsideration of the pending claims.

Applicants believe there are no fees due at this time. However, the Commissioner is hereby authorized to charge any fees necessary or credit any overpayment to Deposit Account No. 50-4871 of King & Spalding L.L.P.

If there are any matters concerning this Application that may be cleared up in a telephone conversation, please contact Applicants' attorney at 512-457-2030.

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